



Internet Services

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Overview

- **Internet Services**

- » **E-mail**

- » **Telnet**

- » **FTP**

- » **WWW**

- » **Others (Archie, Wais, Gopher, News and News Groups, Internet Relay Chat, Internet Phone, Video Conferencing, & Internet Collaborative**

Overview Contents .

- **WAIS**
- **Gopher**
- **WWW**
- **News and News Groups**
- **Internet Relay Chat, Internet Phone,
Video Conferencing, & Internet
Collaborative Tools**

Internet and how did it evolve?

- Computer scientists in the US began to explore ways to directly connect remote computers and their users (1960s).
- US Government decides to fund research in networking (mid to late 1960s).
- Defense Advanced Research Projects Agency (DARPA) extends funds to create an experimental network (1969).

Internet and how did it evolve? Contoõ õ ...

- This network was called ARPANET.
- ARPANET became very successful and converted from an experimental to an operational network (1975).
- ARPANET Administration was handed over to DCA (Defense Communications Agency of the US government).
- In 1990 ARPANET passed away and was taken over by the Internet of today.

Internet Services Concepts & TCP/IP

- The Internet is closely tied with a communication protocol stack called TCP/IP used for transferring data on the Internet itself, as well as on many local area networks.
- TCP/IP stands for Transmission Control Protocol/Internet Protocol.

TCP/IP Conto õ õ ...

- You don't have to know anything about TCP/IP to use the Internet, but knowing some of the basics will help you solve common problems.
- Also, knowing some of the underlying concepts may help give you a better appreciation for the complexity of the system.

TCP/IP Contoõ õ ...

- TCP/IP is the name of a networking protocol.
- A **protocol** is a set of rules that all companies and software products must adhere to in order to make their products compatible with each other.
- The protocol standards are written to take into account all possible circumstances.

TCP/IP Contoõ õ ...

- The protocol also includes the rules that must be followed when things go wrong.
- TCP/IP consists of two separate protocols.
- TCP/IP is not a single product, as many people think.
- It refers to a whole family of related protocols.

TCP/IP Contoõ õ ...

- TCP/IP is designed to be one component of a network, principally the software portion.
- It is the most widely used networking software protocol in the world, used for large multi-site corporate networks as well as small, three or four PC LANs.

TCP/IP Contoõ õ ...

- Your machine is just a number.
- This number is called an **Internet Address** or, more properly an **IP Address**, and is assigned to each machine on the Internet.
- IP addresses are all 32 bits in length, and are broken into four 8-bit parts.

TCP/IP Contoõ õ ...

- The four parts are combined in a notation called **dotted quad**, which means each 8-bit value is separated by a period.
- For example, 255.255.255.255 and 147.120.3.28 are both dotted quad IP addresses.

TCP/IP Contoõ õ ...

- There are really two parts to an IP address: the network number, and the host number within that network.
- If a company or organization wants to directly connect, it may want to have a unique identifier for itself.
- The name helps identify the company or organization to the sender.

TCP/IP Contoõ õ ...

- For example, KFUPM has registered the address
kfupm.edu.sa
- To obtain one of these unique identifiers called a **domain name**, the company or organization sends a request to the body that controls access to the Internet, the Network Information Center or NIC.

TCP/IP Contoõ õ ...

- Part of the domain name is the **domain identifier**, the part of the name that comes last (such as .com).

- Some of the domain names established by the NIC are:

.com Commercial company

.edu Educational institution

TCP/IP Contoõ õ ...

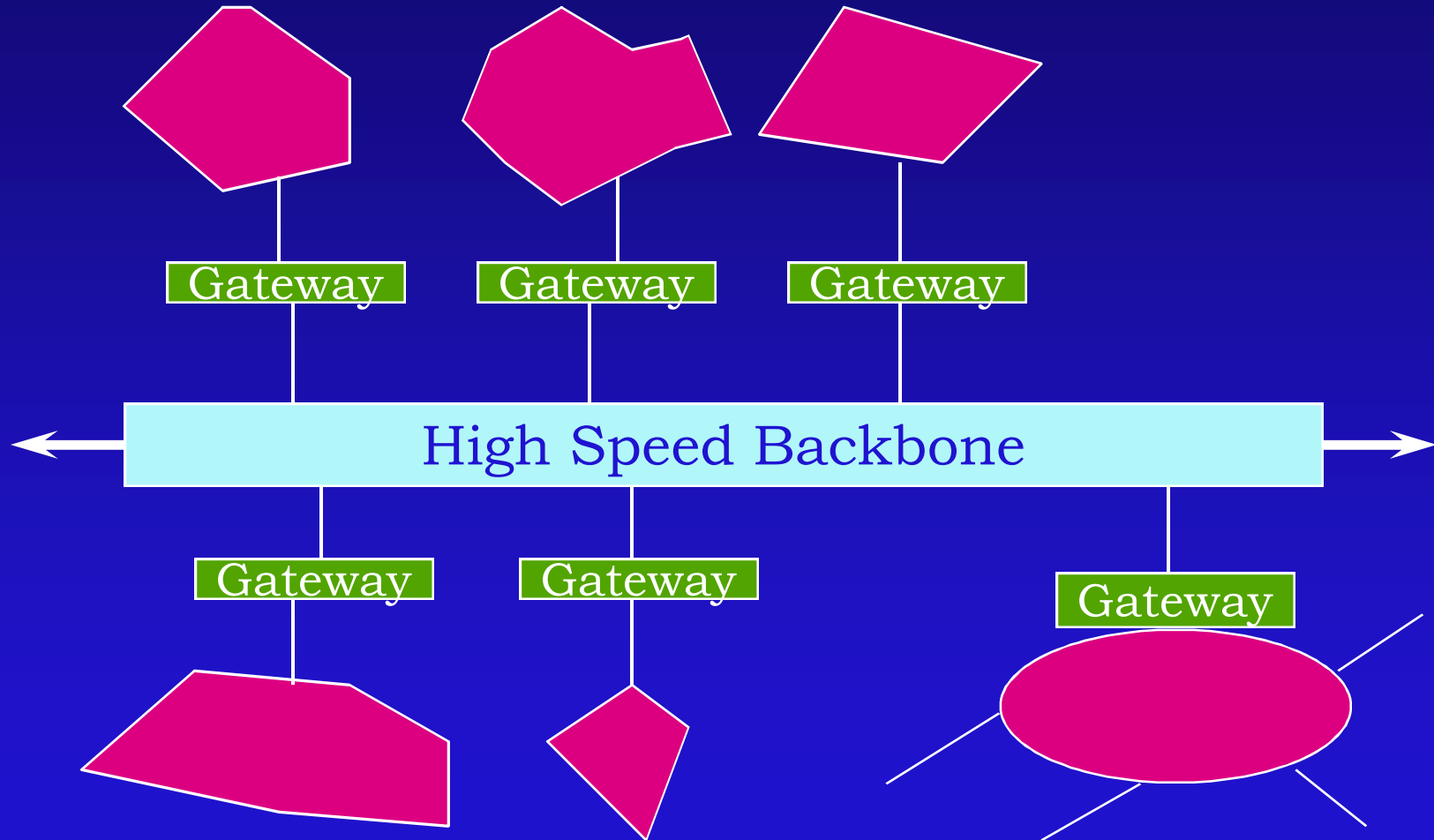
.gov	US Federal governmental body
.mil	US Military
.org	Anything that doesn't fall into any of the other categories.

- The NIC also assigns special letters to identify the country of the company or organization.

TCP/IP Contoõ õ ...

- There are designators for all countries in the world, such as .ca for Canada, .sa for Saudi Arabia, .ku for Kuwait, .bh for Bahrain, etc.

Architecture of Internet

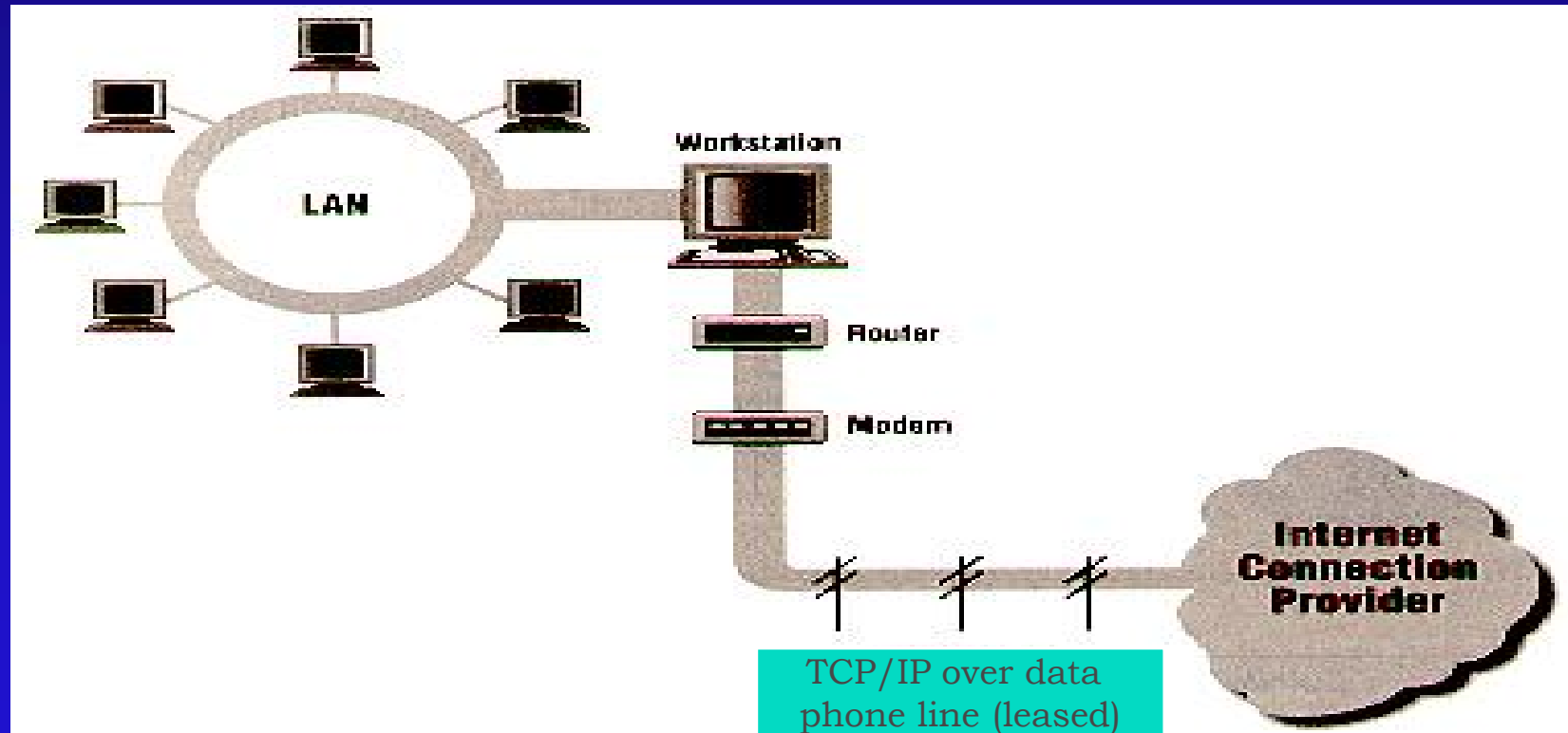


oes it mean to be on the Internet

- There are two major ways of accessing the Internet:
 1. modem access to a computer on the Internet, or **dial-up networking**, and
 2. high speed telephone circuits leased from the phone company.

Does it mean to be on the Internet ...

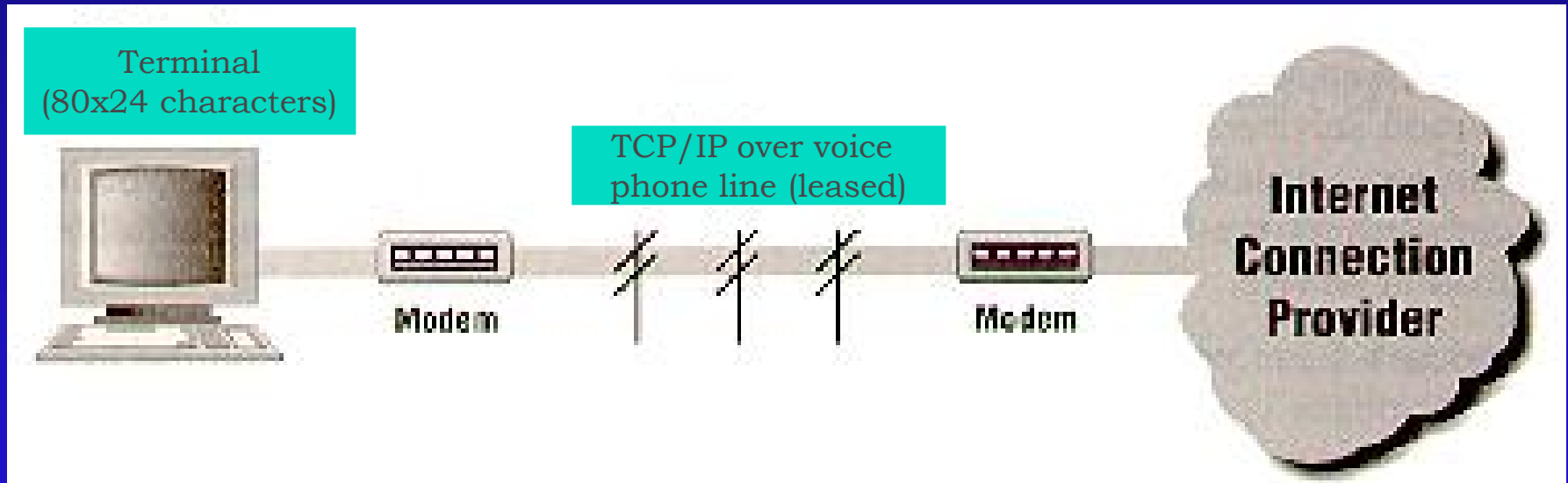
- Full-Time Internet Connection



Does it mean to be on the Internet

Contoõ õ ...

- Dial-up Access to the Internet



Structure of Internet Services

- Almost all the services on the Internet are structured on what is called the **client-server model**. In client-server software architecture, there are two pieces.
- A **client** is responsible for interacting with the user, for example, by accepting keyboard input and displaying data to the user.

Structure of Internet Services

- A **server** is responsible for performing tasks as directed by the client, for example, accessing data on client's behalf, performing calculations, and so on, and then providing data or a simple response to the client.
- The client-server architecture is what makes it possible for any connected computer to provide services to any other.

E-mail

- Electronic mail (e-mail) is one of the most widely used services on the Internet.
- It is easy to send, read, reply to, and manage.
- It is fast and convenient.
- It has many advantages over regular communications methods such as postal service or fax technology.

Email Contoõ õ ...

- Studies have shown that recipients are much more likely to reply to an e-mail message than a written request.
- E-mail can be read or written at any time, independent of time zones and business hours.
- E-mail is global.
- E-mail is also economical and very fast.

How does Email Work??

- The Internet uses a TCP/IP-family protocol called **Simple Mail Transfer Protocol (SMTP)** as the standard method for transferring electronic mail.
- SMTP handles messages in **queues** (also called **spools**).
- When a message is sent to SMTP, it places it in an outgoing queue.

Does Email Work??

Contoõ ã ...

- SMTP attempts to forward the message from the queue whenever it connects to remote machines.
- Usually, if SMTP cannot forward the message within a given amount of time, it is returned with an error message, or simply dropped.

How does Email Work??

Contoõ ã ...

- When a connection is established between two computers that use SMTP, the two systems exchange authentication codes.
- Each system sends a command to the other to identify the first mail message's sender and provides basic information about the message.
- The receiving system returns an acknowledgement, after which the message is transmitted.

Does Email Work??

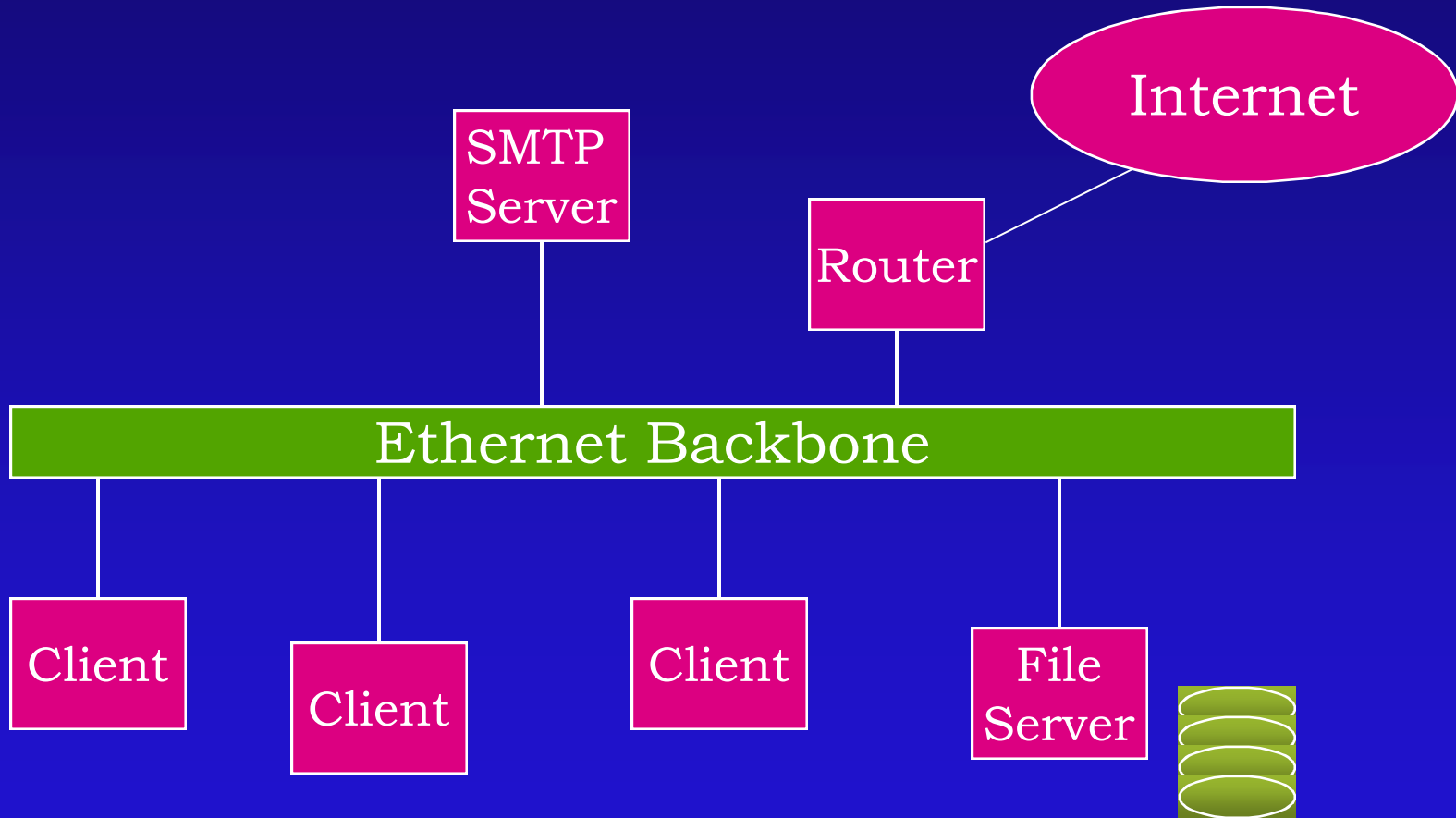
Contoõ õ ...

- SMTP is smart enough to handle multiple destinations for the same message in an efficient manner.

Structure of Email

- A typical e-mail system, such as the one in a company office, usually consists of a mail server, a post office, and the clients.
- The mail system is tied directly to the local area network of the organization.

Structure of Email



Getting Someone's E-mail Address: Finger

- **Finger** is a standard utility supplied with the TCP/IP protocol family that lets you determine who is a valid system user and who is logged into a system you have access to.
- Finger can be used to find out a person's **username** if a mail recipient is logged in on the destination machine.

g Someone's E-mail

Address: Finger Contøõ õ ...

- Finger shows you how long a user has been logged in, where they're logged in from, and what their login names are.

Getting Someone's E-mail Address: Whois

- The Whois program and its accompanying database is maintained by the Internet Network Information Center.
- The system is meant to be a database of all Internet users, but it is far from complete.
- One of the easiest ways to use the Whois service is to telnet to a Whois server and access the database directly.

Getting Someone's E-mail Address: Whois

- Alternatively, you can send an e-mail request to the Whois server and let it perform the search and mail back the results.

E-mail Formats

- Most e-mail systems do not impose limitations on the type of files that can be sent, as long as the network protocol can handle the characters.
- It is also common practice to compress large files for transmission.
- The Internet e-mail system handles binary files by converting them to 7-bit ASCII characters.

Mailing Lists

- A mailing list is a group of e-mail addresses that can be reached by sending a message to one address: the list address.
- Mail sent to that address is redistributed to all subscribers.
- Subscribers can have a discussion by sending messages to the list address (often called **posting** to the list).

Mailing Lists

- The list of addresses can be maintained by hand or with an automated list server system like **Majordomo** or **ListProcessor**.
- Mailing lists are good for many things:
 1. Distributing information from a central source to lots of people.
 2. Discussing a project among participants.

Mailing Lists Contd. ...

3. Exchanging questions and answers with other users of a product or service, or perhaps company technical-support personnel.
- To join a mailing list just send mail to `listserv@domain.name`. where `listserv` is commonly the account through which messages are distributed.

Telnet

- **Telnet** is a program that lets you log into to a remote computer directly through the internet.
- Telnet takes advantage of the way computers are linked in the network by passing your commands from the computer where you're located, onto another computer, which sends it to a third computer, and so on until it reaches the computer you want to access.

Telnet Contoõ õ ...

- Technically **telnet** is a **protocol**.
- Why Use Telnet?
- Telnet to Non-Standard Ports.
- This is accomplished by assigning each server a particular **port number** as identification.
- Telnetting a particular port enables you to log on to a remote system for a particular purpose.

Telnet Contoõ õ ...

- All ports numbered 80 will have Web sites; likewise all port 23s will be used for telnet, and multiuser games will always be found on 4201, etc.

FTP and Archie

- One of the oldest services on the internet is FTP, which allows you to examine the files of remote hosts on the Internet, and transfer files between your host and those hosts.
- FTP is the short for **File Transfer Protocol**.
- One common type of FTP service is an **anonymous FTP**.

FTP Contoõ õ ...

- With this kind of service, you can download or upload files without having an account on the machine.
- If the FTP server isn't anonymous, when you connect to the server you must provide a user name and password, just as though you were logging in to the machine.

FTP Contoõ õ ...

- On an anonymous FTP server, you use the special name **anonymous** (or **ftp**) when you connect.
- Anonymous FTP servers are one of the major means of distributing software and information across the Internet.

FTP Contoõ õ ...

- A large amount of software, mostly free, is available on anonymous FTP servers for many different types of computer systems.
- One of the most frustrating problems with the Internet is the difficulty of finding information such as FTP sites, host resources, sources of information, and so forth.

FTP Contoõ õ ...

- Most FTP sites don't have a listing of all their available files, although some do.
- However, if you have access to WWW, there are services (both free and fee-based) that provide a WAIS based search from inside a WWW browser, helping in locating information.

Archie

- The archie service is a collection of resource discovery tools that together provide an electronic directory service for locating information in an Internet environment.
- Archie creates a central index of files available on anonymous FTP sites around the Internet.

Archie Contolõ õ ...

- The Archie servers connect to anonymous FTP sites that agree to participate and download lists of all the files on these sites.
- These lists of files are merged into a database, which users can then search.
- Users can access an archie server either through interactive sessions or through queries sent via electronic mail messages.

Archie Cont

- The archie server automatically updates the listing information from each site about once a month.
- In addition to offering access to anonymous ftp listings, archie also permits access to the %whatis+description database.

WAIS

- **WAIS** stands for **Wide Area Information Server** and is pronounced *wahyz*.
- **WAIS** searches for words in documents.
- The core of the software is an indexer, used to create full-text indexes of files fed to it, and a server that can use those indexes to search for keywords or whole English expressions among the files indexed.

WAIS

- The server allows the user to specify that a particular document is similar to the one he wanted and uses the contents of the document to find more like it.
- This feature is called **relevance feedback** and is one of the most useful features **WAIS** has.
- The index contains the information the server needs to find a particular word in the database.

WAIS Cont

- The clients simply build queries for the server in the appropriate format, display search results to users, and allow users to retrieve documents from the server.
- Sophisticated clients support many different document types, from plain ASCII text to graphical file formats like GIF and JPEG.

WAIS Contoõ õ ..

- Most of the WWW browsers nowadays have native support for WAIS, meaning that the browser can communicate directly with a WAIS server.

Gopher

- The term **Gopher** refers to:
 - A network protocol
 - A server type
 - One of the many **Gopher** client applications.
- **Gopher** protocol and software allow for browsing information systems so that one doesn't need to know exactly where the needed information is before looking for it.

Gopher Contoõ õ ...

- You do need to know the address of a **Gopher** server to get started, after you are there, the server software presents information in a clear, structured, hierarchical list.
- Most **Gopher** sites have links to others, so after connecting to one, it is quite easy to jump to another.

Gopher Contoõ õ ...

- **Gopher's** user interface is very simple.
- Since the **Gopher** service is text-oriented, it performs well over slow links and can be used by people who only have dial-in access to a machine on the internet.

Limitations of Gopher

- Gopher currently displays only ACSII text data, although you can transfer binary data and display it with other software.
- Most of the time, the menu-item descriptions are brief, sometimes **too** brief.
- Compared with **WWW**, **Gopher** can only provide links from menu items, whereas the **Web** can link from anywhere in the document.

Gopher Protocol

- The client connects to a server.
- The client sends the server a selector string (a string of characters that describes the location of a document on the server).
- The server responds by sending the requested file or directory.

Gopher+

- An extended method of fetching the attributes of a **Gopher** item.
- Multiple formats of a document associated with a single menu item.
- A method of attaching a short description to a **Gopher** item.
- Forcing a client to fill out a form before retrieving an item and access control.

Veronica

- **Veronica** is a service that provides a (very large) index of titles of Gopher items from most servers throughout the Internet.
- The result of a **Veronica** search is a set of **Gopher** items whose titles contain the keyword that the user was searching for.
- The **Veronica** index is accessed via a normal **Gopher** search item.

Jughead

- Another Gopher directory search is **Jughead**.
- Jughead, like Veronica runs as a server on the Gopher site, and provides a pre-built table of directory information that can be searched.
- Unlike Veronica, Jughead is usually implemented for a particular Gopher site.

WWW

- The World Wide Web (known also as the Web) is the most graphical Internet service, and has the most powerful linking abilities.
- The Web is based on a technology called **hypertext**.
- The Web can link from a point in a document or image to any point in the same document or another on the other side of the world.

What's Good about WWW

- Newspapers are being electronically delivered prior to physical delivery into the community.
- Business has employed the WWW to deliver product catalogs on demand to potential consumer's desktops.
- Electronic magazines have emerged.
- Universities are online.
- And much more.

Basic WWW Concepts

- Hypertext
- Hyperlinks
- The HTML Language
- Browsers
- URLs (http://www.ccse.kfupm.edu.sa)
scheme://host.domain[:port]/path/filename
scheme = [file,http,gopher,WAIS,news,telnet]

Basic WWW Concepts Contoõ õ ...

- HTTP & Web Servers
- Home Page
- HTML Editors
- Java (Language + Development Tools)

News & News Groups

- Network news is another way to take part in a lot of discussions over the internet, yet keeping them organized and separate from your mail.
- You don't have to subscribe to a mailing list, and you won't receive lots of mail.
- The news reader helps you keep everything in order.

UseNet

- UseNet is a service carried over the Internet that supports newsgroups.
- The messages everyone using the UseNet sends to a newsgroup, become available for anyone who accesses the newsgroup.
- Newsgroups are organized hierarchically, with the broadest grouping first in the name.

Newsgroups

- There are seven major news categories:

comp, news, rec, sci, soc, talk, misc
- Servers can also get newsgroups by creating them locally.
- Server administrators can create whatever groups they like,

corresponding to the interest of the users.

News Item

- A news item is very similar to an electronic mail message.
- It has the same general parts as an e-mail message; a header and a body.
- The body of a news item is the message's text.
- The header tells the news software how to spread the item throughout the Internet.

Internet Relay Chat

- IRC (Internet Relay Chat) allows you to talk (write) to people from all over the world about a variety of topics, simultaneously and on-line.
- It is mostly used as a recreational communication system.
- It is again a client-server design.

Internet Relay Chat Contoõ õ ...

- The client software allows you to connect to the IRC server, which accepts connections from many IRC clients at the same time.
- The various IRC servers across the Internet are interconnected.

Internet Relay Chat Contoõ õ ...

- There are a number of IRC servers running on the Internet, some of them are:

irc.netsys.com

irc.caltech.edu

irc.indiana.edu

csa.bu.edu

irc.nada.kth.se

- When you connect to an IRC server, you will usually be asked for a port number in addition to the Internet address.

Internet Relay Chat Contoõ õ ...

- Most of the time, this port number is 6667.
- Some IRC Terms:

Nicknames

IRC Channels

Internet Phone

- Internet phones let you talk (literally talk, with voice not in writing) to people all over the world, just for the price of your Internet connection.
- It demands a reasonably fast machine with support for audio devices.
- Internet phones are essentially for point-to-point communications.

Internet Phone Contoõ õ ...

- The heart of any Internet phone tool is the **coder-decoder** or **codec**, the software that compresses the digitized voice data and decompresses it at the other end.
- Most Internet Phones offer more than just telephony, e.g., voice mail, answering machines, and similar features.

Video Conferencing

- Internet Video Conferencing offers a low-cost alternative to traditional proprietary systems.
- It demands high bandwidths.
- It requires a video camera and related hardware card.
- Video-conferencing is largely point-to-point.
- Only very few packages support true multiconferencing.

Internet Collaborative Tools

- Internet collaborative products deliver a host of interactive technologies that bring workgroups closer together.
- Multiple users can work together in an application, sketch out ideas, chat, and pass files back and forth.

WWW Development

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Topics Covered in this Session

- Web Page Design and HTML
- Web Client/Server Software and HTTP
- Images and Image Maps
- Forms, and Web-database integration
- Other topics